SYSTEM AND METHOD FOR TRANSFERRING PERIODIC DATA STREAMS ON A MULTIMEDIA BUS

This application is a continuation of application No. 08/559,662, filed Nov. 20, 1995, now abandoned.

FIELD OF THE INVENTION

The present invention relates to a computer system which includes a system expansion bus such as the Peripheral Component Interconnect (PCI) bus and also includes a separate real-time or multimedia bus which transfers periodic and/or multimedia stream data for increased system performance for multimedia and real-time applications.

DESCRIPTION OF THE RELATED ART

Computer architectures generally include a plurality of devices interconnected by one or more various buses. For example, modem computer systems typically include a CPU coupled through bridge logic to main memory. The bridge logic also typically couples to a high bandwidth local expansion bus or system expansion bus, such as the peripheral component interconnect (PCI) bus or the VESA (Video Electronics Standards Association) VL bus. Examples of devices which can be coupled to local expansion buses include video accelerator cards, audio cards, telephony cards, SCSI adapters, network interface cards, etc. An older type expansion bus is generally coupled to the local expansion bus for compatibility. Examples of such expansion buses included the industry standard architecture (ISA) bus, also referred to as the AT bus, the extended industry standard architecture (EISA) bus, or the microchannel architecture (MCA) bus. Various devices may be coupled to this second expansion bus, including a fax/modem, sound card, etc.

Personal computer systems were originally developed for business applications such as word processing and spreadsheets, among others. However, computer systems are currently being used to handle a number of real time applications, including multimedia applications having video and audio components, video capture and playback, telephony applications, and speech recognition and synthesis, among others. These real time applications typically require a large amount of system resources and bandwidth.

One problem that has arisen is that computer systems originally designed for business applications are not well suited for the real-time requirements of modern multimedia applications. For example, modern personal computer system architectures still presume that the majority of applications executing on the computer system are non real-time business applications such as word processing and/or spreadsheet applications, which execute primarily on the main CPU. In general, computer systems have not traditionally been designed with multimedia hardware as part of the system, and thus the system is not optimized for multimedia applications. Rather, multimedia hardware is typically designed as an add-in card for optional insertion in an expansion bus of the computer system, wherein the expansion bus is designed for non-realtime applications.

In many cases, multimedia hardware cards situated on an expansion bus do not have the required system bus bandwidth or throughput for multimedia data transfers. For example, a multimedia hardware card situated on the PCI expansion bus must first arbitrate for control of the PCI bus before the device can begin a data transfer or access the system memory. In addition, since the computer system

architecture is not optimized for multimedia, multimedia hardware devices are generally required to share bus usage with non-real time devices.

Also, multimedia hardware devices generally do not make efficient usage of system resources. As an example, multimedia hardware cards typically include their own memory in addition to system memory. For example, video accelerator cards are typically configured with one to four Megabytes of video RAM. Audio cards, video capture cards, and other multimedia cards are also generally configured with dedicated on-board memory. This requirement of additional memory adds undesirable cost to the system.

As multimedia applications become more prevalent, multimedia hardware will correspondingly become essential components in personal computer systems. Therefore, an improved computer system architecture is desired which is optimized for real-time multimedia and communications applications as well as for non-realtime applications. In addition, improved methods are desired for transferring real-time data between multimedia devices.

Applicant is aware of two new graphics standards from the Video Electronics Standards Association (VESA) which are designed to improve digital video transfers in computer systems. These two standards are referred to as the VESA advanced feature connector (VAFC) and the VESA media channel (VMC). A third standard has been proposed by Intel and ATI referred to as the shared frame buffer interconnect (SFBI).

The VAFC standard is a 32 bit replacement for prior 8 bit VGA connectors which supports video at much higher resolutions and in better color. The VMC standard also offers a 32 data path and supports up to 15 video streams simultaneously. The VMC standard comprises a dedicated channel for real-time video, and peripherals can communicate independently without slowing the system CPU. The VMC standard also decouples the memory subsystem from the video transfer specification, allowing graphics board manufacturers to offer a variety of boards with differing types of graphics memory.

The SFBI standard combines frame buffers and memory use by each multimedia system into a single shared memory pool. The SFBI standard also includes a protocol for arbitrating among devices attempting to access the memory. However, one drawback to this standard is that the standard is designed to maintain all of the components on a single board. The SFBI standard does not provide an external feature connector unless SFBI cards are connected to another over the host bus. In addition, SFBI cards can include a VMC or VAFC connector for connecting to a VMC or VAFC card.

SUMMARY OF THE INVENTION

The present invention comprises a computer system and method optimized for real-time applications which provides increased performance over current computer architectures. The system preferably includes a standard local expansion bus or system bus, such as the PCI bus, and also includes a dedicated real-time bus or multimedia bus. Thus multimedia devices, such as video devices, audio devices, etc., as well as communications devices, transfer real-time data through a separate bus without requiring arbitration for or usage of the PCI bus. The computer system of the present invention thus provides much greater performance for real-time applications than prior systems. In an alternate embodiment, the computer system only includes one or more dedicated real-time buses which replace the PCI bus.